

REMARKS

The Office Action of January 23, 2007 has been received and its contents carefully considered. Reconsideration is respectfully requested in view of the amendment and the following comments.

Claims 1, 3-7, 23 and 24 are currently pending in the instant application.

Claims 1 and 3 have been amended. The subject matter of claim 8 has been incorporated into independent claim 1, which is now the sole independent claim.

Claims 2, 8, 9, 11, 12, 18 and 19 are being cancelled herein. Claims 10, 13-17 and 10-22 were previously cancelled.

I. Rejection under 35 USC 112, first paragraph

Claims 1, 4-6 and 8 were rejected under the first paragraph of Section 112 as failing to comply with the written description requirement. In particular, the Examiner has objected to the introduction into independent claim 1, by virtue of a previous amendment, of the phrase "without applying adhesive tape in addition to the protective layer." The offending phrase has been eliminated from claim 1 for the sake of expediting prosecution. However, elimination of the phrase does not amount to an acquiescence by Applicant that the phrase is unsupported by the original specification.

In view of the above, the Examiner is respectfully requested to reconsider and withdraw his rejection of the claims under the first paragraph of Section 112.

II. Rejection under 35 USC 103(a)

Claims 1, 4, 5 and 8 have been rejected under Section 103(a) as being unpatentable over Kumanoto in view of Walsh.

Claim 6 has been rejected under Section 103(a) as being unpatentable over Kumamoto in view of Walsh and further in view of Nguyen et al.

Claims 2, 3, 7, 9, 11, 12 and 18 have been rejected under Section 103(a) as being unpatentable over Kumamoto in view of Nguyen et al.

Claim 19 has been rejected under Section 103(a) as being unpatentable over Kumamoto in view of Nguyen et al. and further in view of White.

Claims 1, 4-6 and 8 have been rejected under Section 103(a) as being unpatentable over Satoh in view of Nguyen and Walsh.

Claims 2, 3, 7, 9, 11, 12 and 18 have been rejected under Section 103(a) as being unpatentable over Satoh in view of Nguyen.

Claim 19 has been rejected under Section 103(a) as being unpatentable over Satoh in view of Nguyen et al., and further in view of White.

Reconsideration is respectfully requested.

The rejections of claims 2, 8, 9, 11, 12, 18 and 19 have been mooted by virtue of their cancellation.

It is clear from the original specification, and the original figures of the instant application that embodiments are concerned with using the same protective layer to protect a chip during backgrinding of a wafer including the chip, and also to serve as the underfill material during flip chip mounting of the chip onto a package substrate. Sole independent claim 1 now clearly sets forth the above by specifically mentioning

that: (1) the wafer is separated into individual chips while simultaneously separating the protective layer to a plurality of sections, each of the sections remaining in contact with a corresponding one of the plurality of chips; and further that (2) at least one of the chips is attached to a substrate by connecting the connection structures to the substrate, wherein a section of the plurality of sections of the protective layer remaining in contact with said at least one of the chips after separation of the wafer remains between the chip and the substrate after attachment. Support for the above may be found in original claim 8 (now cancelled), the original figures, for example Figs. 6b and 7, and in the original specification, for example at paragraph [0022], where it is mentioned that "the term 'protective layer 302' may refer to both the layer 302 that covers the entire wafer 200 and the portion 302 of the layer that covers a single die 202 after singulation." In other words, the same protective layer on the chips before singulation is the protective layer serving as the underfill material according to embodiments.

The above Section 103(a) rejections all use either Kumamoto or Satoh as the primary references. However, both of these references clearly teach away from embodiments. Both Kumamoto and Satoh require the use of a peel away tape before mounting the die onto a package substrate. Kumamoto even mentions the necessity of protecting the dice during backgrinding:

"care must be taken such that byproducts from the back5 [sic] process do not contaminate the circuit surface. For example, non-conductive particles from the back-grind process may interfere with subsequent electrical conduction interconnections between

conductive arrangements.... As another example, conductive particles may cause short-circuiting between electrical circuits of the circuit surface 120. Still further, chemicals from the back-grind process may have a disadvantageous chemical effect on the circuit surface 120." Page 2, paragraph [0023]

Thus, doing away with a peel away tape on the active surface of the dice in Kumamoto would go against the teachings expressly set forth therein as quoted above. To the extend that Kumamoto does not use and teach away from using the same protective layer as a back-grind protection and as an underfill, Kumamoto cannot render obvious embodiments as set forth in independent claim 1.

Satoh is concerned with providing "a method for manufacturing a chip-scale package and an IC chip, which facilitate handling at the time of manufacturing a semiconductor device with satisfying the demands of small size and thinning. Satoh achieves the above by applying a protective resin onto the active surface of an IC wafer, and using an adhesive member on the resin which is later peeled away. Clearly, the adhesive member is necessary in Satoh et al. in order to impart rigidity to the IC wafer during processing. Moreover, removal of the adhesive member allows a further thinning of the resultant IC chip before mounting of the chip onto a package substrate.

Similar to Kumamoto, doing away with a peel away tape on the active surface of the dice in Satoh would go against the teachings

expressly set forth therein as quoted above. To the extend that Satoh does not use and teaches away from using the same protective layer as a back-grind protection and as an underfill, Satoh cannot render obvious embodiments as set forth in independent claim 1.

None of the secondary references mention above cure the deficiencies in Kumamoto or Satoh noted above.

At least for the above reasons, the references cited, either alone or in combination, are inapplicable to the independent claim 1. In addition, the cited references, either alone or in combination, are further inapplicable to the dependent claims at least by virtue of their dependency from independent claim 1.

In view of the above, It is submitted that independent claim 1 is patentable over the cited references, either alone or in combination. In addition, the dependent claims are patentable over the cited references for being dependent from independent claim 1, and further for the particular additional features that they recite.

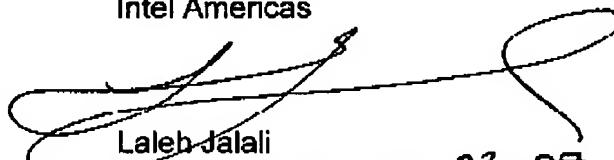
Accordingly, the Examiner is respectfully requested to reconsider and withdraw his rejection of the claims based on Section 103(a), and to allow the application.

CONCLUSION

In view of the foregoing, Applicant respectfully submits that the present application is now in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call the undersigned attorney at (703) 633-0944.

Although an extension of time is not deemed necessary, the Office is hereby requested and authorized to charge any extension of time fees, or any other fee required to maintain the application pending, against Deposit Account No. 50-0221

Respectfully submitted,
Intel Americas



Laleh Jalali
Reg. No. 40,031 04-23-07
703 633 0944

Intel Corporation
c/o Intellevate, LLC
P.O. Box 52050
Minneapolis, MN 55402